

**IN THE CLAIMS:**

1 1. (Currently Amended) A shutter mechanism for controlling reactants in a direct oxida-  
2 tion fuel cell system, having at least one fuel cell including a membrane electrode assem-  
3 bly, comprising:

4 a moving component disposed within the fuel cell between a source of a reactant  
5 and the membrane electrode assembly, said moving component having a plurality of lat-  
6 erally displaced protrusions, wherein said movable component is adjustable in a direction  
7 perpendicular to the plane in which the component is disposed, such that when it is ad-  
8 justed, the component travels generally in a z-axis within a vapor gap, closer to or further  
9 away from an anode current collector, to control fuel flow while not consuming substan-  
10 tially additional volume within the fuel cell; and

11 ~~a receiving element~~ the anode current collector formed forming with a plurality of  
12 laterally displaced openings corresponding to the plurality of laterally displaced protru-  
13 sions, such that when said moving component is placed adjacent to said receiving ele-  
14 ment, the flow of said reactant is controlled, wherein said movable component is config-  
15 ured such that when said movable component is adjusted to a closed position, said protru-  
16 sions interconnect with the openings in the anode current collector to substantially seal  
17 said openings, and said movable component also having apertures therein interspersed  
18 with said protrusions in such a manner that when said movable plate is in an open posi-  
19 tion, said apertures allow for flow of fuel therethrough to the membrane electrode assem-  
20 bly.

1 2. (Cancelled)

1 3. (Previously Presented) The shutter mechanism as defined in claim 1 wherein said mov-  
2 ing component is placed between a fuel source and an anode aspect of said fuel cell, and

3 said receiving element is an anode current collector and when said moving component is  
4 placed adjacent to said anode current collector, fuel flow to said anode aspect is re-  
5 stricted.

1 4. (Currently Amended) A shutter mechanism for a direct oxidation fuel cell system,  
2 comprising:

3 (A) a fuel source;

4 (B) a direct oxidation fuel cell, including:

5 (i) a protonically conductive membrane having catalyst coatings on  
6 each of its major surfaces, being an anode aspect and a cathode as-  
7 pect;

8 (ii) an anode current collector disposed generally at said anode aspect;

9 (iii) a cathode current collector disposed generally at said cathode as-  
10 pect;

11 (iv) a passive mass transport barrier disposed generally between said  
12 fuel source and said anode aspect and spaced from said anode as-  
13 pect to define a vapor gap in said fuel cell, said passive mass trans-  
14 port barrier controlling a rate of fuel delivery to said catalyzed an-  
15 ode aspect of said fuel cell;

16 (v) a movable shutter plate having a plurality of laterally displaced  
17 protrusions disposed within said vapor gap between said passive  
18 mass transport barrier and said anode current collector which  
19 forms a plurality of laterally displaced openings corresponding to  
20 the plurality of laterally displaced protrusions such that said mov-  
21 able shutter plate is adjustable to substantially or partially prevent  
22 fuel flow through said anode current collector to the anode aspect  
23 of said fuel cell, wherein said movable plate is configured such that

24 when said movable plate is adjusted to a closed position, said pro-  
25 trusions interconnect with the openings in the anode current collec-  
26 tor to substantially seal said openings, and said movable plate also  
27 having apertures therein interspersed with said protrusions in such  
28 a manner that when said movable plate is in an open position, said  
29 apertures allow for flow of fuel therethrough, and said movable  
30 plate is adjustable in a direction perpendicular to the plane in  
31 which the plate is disposed, such that when it is adjusted, the plate  
32 travels generally in a z-axis within said vapor gap, closer to or fur-  
33 ther away from said anode current collector, to control fuel flow  
34 while not consuming substantially additional volume within said  
35 fuel cell; and

- 36 (vi) a load coupled between said anode current collector and said cath-  
37 ode current collector for utilizing the electricity generated by the  
38 fuel cell.

1 5. (Cancelled)

1 | 6. (Currently Amended) The shutter mechanism as defined in claim 5-4 further compris-  
2 ing:

3 said protrusions have angled sides; and

4 said openings in said anode current collector being correspondingly angled such  
5 that said protrusions interconnect securely within said angled openings of said current  
6 collector to substantially seal said openings against fuel flow.

1 | 7. (Currently Amended) The shutter mechanism as defined in claim ~~5~~4 wherein said pro-  
2 | trusions are substantially comprised of a compliant material that is compressed into said  
3 | openings when said movable plate is adjusted to a closed position.

1 | 8. (Currently Amended) The shutter mechanism as defined in claim ~~5~~4 further compris-  
2 | ing a coating disposed on the sides of said protrusions in said movable plate which fur-  
3 | ther secures sealing of said anode current collector against fuel flow therethrough.

1 | 9-26. (Cancelled)